LAW OFFICES
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REMARKS

The Office action of September 8, 2004, has been carefully considered.

Claim 17 has been amended in order to correct an error in the presentation of the claim as previously amended.

Claims 17 through 23, 26 through 35, 37 through 39 and 41 have been rejected under 35 USC 103(a) over any of Dantzig et al '235, Dantzig et al '679 and Dantzig et al '187 in view of Montgrain. The Dantzig et al references have been cited to show a device and method for injecting gas bubbles into molten aluminum utilizing a static injection part made of a material which is disclosed as preferably being an inert, open cell ceramic foam having discreet orifices therethrough. This part has a substantially planar surface without protuberances or discontinuities and the plate is designed so that bubbles do not come into contact while they are being formed.

Montgrain has been cited to show the use of a static injection part including protuberances and discontinuities, the part made of iron, silicon carbide or refractory materials. The Office action alleges that it would have been obvious to employ the well known materials of Montgrain as the material for the plate of any of the Dantzig et al references.

The invention is based on the discovery that bubble size may be controlled by utilizing a material that can be wetted by the liquid metal. To the contrary, the Dantzig et al references and Montgrain both teach that the size of the bubbles is determined by the size of the orifices. See column 6, lines 45-50 of the Dantzig et al '235, column 6, lines 48 through 53 of Dantzig et al '187 and column 4, lines 37-42 of Dantzig et al '679, as well as column 3, lines 16-18 of Montgrain. Thus, one of ordinary skill of the art has no reason to look beyond orifice size in order to control bubble

size; there is no disclosure or suggestion that the orifice material may influence bubble size.

Moreover, Montgrain teaches the use of protrusions, and states that the efficiency of the injection rapidly decreases as the transverse dimension of the protrusions increases; see column 3, lines 25-38. Montgrain further explains that the protrusions must have a minimum size in order to prevent the bubbles from climbing down the sides of the protrusions. Thus, Montgrain teaches one of ordinary skill in the art to utilize an injector with protrusions having transverse dimensions of between 2 and 12.5 mm.

This disclosure of Montgrain clearly teaches that a flat injector surface, as is used according to Dantzig et al references and the claimed invention, should not be used.

In the Dantzig et al references, the only material utilized for the injectors is a cast ceramic, and as noted above, preferably an open cell ceramic foam. Nothing in any of the Dantzig et al references suggests the use of a material which is wettable by liquid aluminum.

Thus, the combination of teachings of these references does not make the present invention obvious, and indeed, combining the references is not suggested by the teachings of the references. Montgrain teaches specifically that the use of protuberances is necessary and utilizes a wide range of materials, none of which is identified as being wettable. The Dantzig et al references teaches the use of a flat-faced, cast ceramic injector, and provide no reason why one of ordinary skill in the art would utilize wettable materials as a replacement for the cast ceramic, particularly because Montgrain teaches against the physical arrangement of the Dantzig et al references, and because wettable materials are not specifically mentioned by Montgrain.

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Withdrawal of this rejection is accordingly requested.

Claims 36 and 40 have been rejected under 35 USC 103(a) over Dantzig et al '235, '679 or '187 in view of Montgrain and further in view of Manabu et al.

Manabu et al discloses that bubbles in molten metal may be monitored by x-ray monitoring, but does not otherwise cure the defects of the Dantzig et al and Montgrain references. Withdrawal of this rejection is requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,

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